ABSTRACT

The invention relates to laser technology and fiber optics. A dispersion element based on a planar photonic crystal structure formed in a layer of a high index material is disclosed. The planar photonic structure in one embodiment comprises a plurality of parallel grooves with a predetermined width and depth, wherein a pulse propagates perpendicular to the grooves, and a length of the dispersion element is defined so that to provide maximum compression of a phase-modulated pulse. The periodic structure in accordance with a second embodiment comprises a two-dimensional periodic structure shown in Fig.8, sites of the structure having first holes 5 equal to each other and forming columns, and second holes 6 equal to each other and forming a predetermined number of adjacent columns, the sizes of the first holes being different from that of the second holes, wherein the sizes of the first and second holes and refractive indexes of the high index material and the substrate are defined so that to provide guided propagation of the phase-modulated pulse in one-mode operation along the columns of the second holes in the above structure, and a length of the dispersion element in the second embodiment is defined so that to provide maximum compression of a phase-modulated pulse.

Text matter in the drawings

Fig.1

1 - Input pulse; 2 - Phase-modulated pulse

Fig. 2a, b.

1 - 2-5 mm; 2 - Photonic crystal region

Fig 3A,B; Fig.4A,B; Fig.5A,B; Fig.6A,B; Fig.7A,B

A: 1 - a/(wavelength); 2 - [wave vector]/[2π/a];

B: 1 - Group velocity dispersion, ps^2/mm; 2- Wavelength, nm

Fig.9A,B; Fig.10A,B

1 - a/[wavelength]; 2 - [wave vector]/(2π/a);

Fig.11A,B

1 - nm